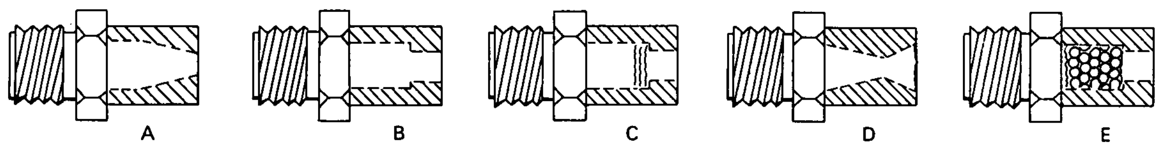
NASA TECH BRIEF

Nozzles for Size Reclassification of Microfog Particles



Standard reclassifying nozzles in common use with mist lubrication systems were modified in order to create larger particle sizes in the mist.

Normally, the microfog is generated pneumatically as small particle sizes to permit its transport without excessive wetting out on the pipe walls. It is desirable to increase the mist particle size just prior to its application on a lubricated surface in order to efficiently wet out as a liquid surface film. For this purpose, converging type reclassifying nozzles are commonly employed, as illustrated by configurations A and B.

It is generally thought that converging nozzles function by causing particles to coalesce into larger particles. The concept here differs from this general approach in that consideration was given to a more likely mechanism, the wetting out of particles within the nozzle with continuous reatomization of the resulting liquid film by the gas passing through the nozzle. This concept led to the design and construction of experimental nozzles wherein materials to enhance both the wetting out and reatomization steps were included in the cavities of the nozzles. Examples of such nozzles are illustrated by C, D, and E. Nozzle C consists of a standard converging nozzle in which three circular 150 mesh stainless steel screens have been placed in close proximity across the shoulder behind the orifice. Nozzle D has both converging and diverging sections, with a single 150 mesh screen across the front of the diverging section. Nozzle E is a standard converging nozzle packed with glass beads held in place by a pair of circular 150 mesh screens. In addition, a sixth type of nozzle was used in this comparison. This consisted of a cylindrical nonconverging nozzle having a solid front surface into which were drilled 18 holes each with a diameter of 0.067 inch. Comparisons were made with and without materials packed inside the nozzle.

The effectiveness of nozzle modification in terms of the wetting rate for a flat metal plate heated to 600°F was demonstrated in a series of tests. It was found that the wetting rate for nozzle C was about six times greater than that of a conventional converging nozzle B. It was further found that the use of glass beads and steel wool packings were effective in producing large particle sizes and thereby enhancing wetting.

Nozzles with still other packings, including alternate layers of screens and glass beads, Teflon shavings, and screens spiraled into a cylindrical shape, gave evidence of increased particle size. Many variations are, of course, possible. An almost infinite number of compositions and shapes of packing materials can be

(continued overleaf)

combined in numerous ways and the composition, number, mesh size, and spacing of screens may be varied.

Notes:

1. Additional documentation is available from:
   Clearinghouse for Federal Scientific
   and Technical Information
   Springfield, Virginia 22151
   Price $3.00
   Reference: TSP69-10076
2. Technical questions may be directed to:
   Technology Utilization Officer
   Lewis Research Center
   21000 Brookpark Road
   Cleveland, Ohio 44135
   Reference: B69-10076

Patent status:

No patent action is contemplated by NASA.

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